

- c) a support body on which the abrasive flaps are fixed; and
- d) a device for connecting the flap-type grinding tool to a drive apparatus, wherein the support body has at least one rotationally symmetrical lateral surface on which the abrasive flaps are at least partly fixed, and wherein the support body comprises at least one central element configured as a disk which extends essentially radially to the axis of rotation and the device for connecting the flap-type grinding tool to a drive apparatus has at least one contact surface formed by the disk for connecting the flap-type grinding tool to a drive apparatus and the support body further comprises a separate carrier ring which holds the flaps and on whose radially outermost outside one of the lateral surface is formed approximately parallel to the axis of rotation or at least inclined at less than 75 degrees to the axis of rotation.

REMARKS

This communication is in response to the Office Action dated June 26, 2001. A three month period was set to respond to the Office Action, making a response due on or before September 26, 2001. The Applicants are filing concurrently with this response a three months extension of time under 37 CFR 1.136 (a) with the required fee which brings the timely response to be due on or before December 26, 2001.

Enclosed is another version of the rewritten claim marked up to show all of the changes relative to the previous version of that claim.

Status

The status of the Application is that claims 19 to 37 are pending, and all claims stand rejected by the Office Action. The rejections include Section 112 first paragraph rejections and Section 102 (e) and Section 103 (a) rejections.

The Examiner has objected to the drawings in the application on the grounds that they do not show every feature of the invention specified in the claims, as required by 37 CFR 1.83 (a).

OVERVIEW OF THE INVENTION

The flap-type grinding tool of the invention is a multi-part product allowing separation of the parts after use of the grinding tool by allowing re-use or recycling of reasonable parts, while minimizing the amount of waste coming with the use of a grinding tool according to the invention. It is easier in mass production to obtain accurate circular motion of the grinding tool and better working quality. This is the case even though its manufacture appears to be more complicated than the manufacture of prior art flap-type grinding tools, and therefore disadvantageous in the light of prior art teachings.

However, the invention proposes a flap-type grinding tool in which the support body comprises at least one central element configured as a disk, and the support body additionally comprises a separate carrier ring which is removable from the support body and which holds the abrasive flaps.

As a result of this configuration, the production of such a tool can be made more accurate with respect to the precision of rotational movement and, moreover, the quantity of waste caused by consumption can be reduced, because the tool can be disassembled to obtain

parts for recycling or reuse and only a small amount of material needs to be dumped. Problems with the dimensional stability of the tool can be avoided. These are caused by the resilience of the flanged edge in the deep-drawing of conventional support bodies known for instance from Emerson, which cannot be avoided because of the anisotropy of the semi-finished product caused by rolling the raw material.

As a result of the multipart nature of the support body, the abrasive flaps can be particularly simply positioned in a sufficiently exact orientation. After use, the parts of the flap-type grinding tool can be separated and disposed of separately or, at least in part, returned to the production cycle.

In a particularly advantageous embodiment, the disk is formed by an automatically acting eccentric or centrifugal force clamping apparatus. With this embodiment, the consumable part of a tool according to the invention can be kept particularly small and replaced particularly quickly, especially without the need on each occasion to have to release the chuck or the like, which is a critical safety feature to guard against incorrect operation, and then refasten it again. Once the machinery stops turning, the worker is able to simply slip off the carrier ring with the used flaps sideward, and to slip on a new one, which is automatically clamped once the machinery starts turning.

The automatic clamping apparatus may act either with centrifugal forces depending on turning of the tool which a disc like central body having elements extending radially outwards by centrifugal force and thus clamping the carrier ring. The automatic clamping apparatus may alternatively be designed with an eccentric disc like central body having elements extending radially outwards by an initial difference in rotatory speed caused by the moment of inertia when the machine starts turning.

It is important to appreciate that there are two "clamping apparatus" and at any one point one must be clear as to which clamping apparatus is being discussed. With that in mind, the present application becomes much easier to appreciate. The Examiner must appreciate the difference between the clamping apparatus for fastening a carrier ring with grinding flaps onto the support body on the one hand, referred to as an automatically acting clamping apparatus in the form of an eccentric clamping apparatus or a centrifugal clamping apparatus, and a rapid clamping apparatus for connecting the flap-type grinding tool as a whole to a drive apparatus.

In the International Preliminary Examination Report of the PCT portion of this case (which International Preliminary Examination Report and an English translation thereof should have been officially provided by the International Bureau, another copy of which will be filed for the Examiner's convenience on request), the novelty of the present invention over Emerson was generally recognized. Particularly, the subject matter of claims 7 to 15, corresponding to claims 25, 26, 27, 28 – 30, 31 – 33, and 36 to 37 presently pending, were expressly found to have novelty, inventive step and industrial applicability over Emerson. The International Preliminary Examination Report states:

"The combination of features in dependent claim 7 is neither known from nor suggested by the available prior art. These features makes it possible to withdraw or assemble the support ring easily while the machine is at a standstill. Claim 7 and its dependent claims, claims 8 to 15, therefore meet the requirements of PCT Article 33."

DRAWINGS

In paragraph 1 of the Office Action, the Examiner objects to the drawings, alleging that they fail to show "the device, automatic acting clamping apparatus, eccentric clamping apparatus, centrifugal clamping apparatus, rapid clamping apparatus, socket

connection, bayonet connection, single-pitch screw, multi-pitch screw, single-pitch nut thread, multi-pitch nut thread, rectangular thread, trapezoidal thread".

Applicants' Response

As an initial matter Applicants respectfully remind the Examiner that the present application is a national stage of an international patent application filed under the Patent Corporation Treaty (PCT). The United States ratified the PCT and is bound by the PCT and Regulations Under the PCT. Consequently, this application is governed by the Articles and Rules of the PCT and Regulations.

Article 27 of the PCT regarding national requirements states in its paragraph (1) that no national law shall require compliance with requirements relating to the form or contents of the international application different from or additional to those which are provided for in the PCT and the Regulations, with the rare exceptions indicated in Article 27 (2) PCT. According to Article 27 (5) PCT any contracting state is free to apply, however, when determining the patentability of an invention claimed in an International application, the criteria of its national law in respect of prior art and other conditions of patentability not constituting requirements as to the form and contents of applications.

Articles 6 and 7 and Rules 6 and 7 of the PCT and Regulations define the requirements to the form and contents of the claims and the drawings, respectively. There is no requirement indicating that the drawings must show every feature mentioned in the claims.

As the requirements of 37 CFR 1.83 (a) goes beyond the requirements as to the form and contents of the application laid down in the PCT and Regulations, which supersede 37 CFR 1.83 (a), the latter is not applicable to the case.

Furthermore, Applicants respectfully disagree with the Examiner's objections and would like to draw the Examiner's attention to the original set of claims containing reference signs in respect to the drawings, indicating that "the device for connecting the flap-type grinding tool to a drive apparatus" is depicted by reference signs 5 and 11 in the drawings, as can be seen from original claim 1, feature c). The eccentric clamping apparatus and centrifugal clamping apparatus, generally referred to as automatically acting clamping apparatus, of claims 25, 36, and 37, are depicted by reference signs 13, 14, 15, and 16, shown in detail in figure 4 and described on page 6, lines 15 to 24, page 9, lines 12 to 17, and in more detail with reference to figure 4, from page 12, line 22, to page 14, line 5.

Accordingly, Applicants respectfully request that the Examiner's objection to the drawings be withdrawn.

CLAIM REJECTIONS – 35 USC § 112

In paragraph 2 of the Office Action, the Examiner objects the disclosure of the specification on the grounds that claims 25, 26, 29, 30, 36, and 37 contains subject matter not described in the specification to enable one skilled in the art to which it pertains, etc., to make and/or use the invention. In particular, the Examiner alleges the features such as an automatically acting clamping apparatus, an eccentric clamping apparatus, a centrifugal clamping apparatus, a socket connection, a bayonet connection, single-pitch screw and nut thread, multi-pitch screw and nut thread, a rectangular thread, a trapezoidal thread are not fully disclosed in the drawings and/or specification to enable one skilled in the art to make and use the invention. More particularly, the Examiner alleges difficulty in understanding how these features relate to the flap-type grinding tool or how these features connect the grinding tool to the driving apparatus.

Applicants' response

As an initial matter Applicants respectfully remind the Examiner that the present application is a national stage of an international patent application filed under the Patent Corporation Treaty (PCT). The United States has ratified the PCT and are therefore bound by the PCT and Regulations Under the PCT. Consequently, this application is governed by the Articles and Rules of the PCT and Regulations.

Article 27 of the PCT regarding national requirements states in its paragraph (1) that no national law shall require compliance with requirements relating to the form or contents of the international application different from or additional to those which are provided for in the PCT and the Regulations, with the rare exceptions indicated in Article 27 (2) PCT. According to Article 27 (5) PCT any contracting state is free to apply, however, when determining the patentability of an invention claimed in an International application, the criteria of its national law in respect of prior art and other conditions of patentability not constituting requirements as to the form and contents of applications.

To avoid lengthy repetition of arguments already presented, the Examiner's attention is drawn to Applicant's response in section DRAWINGS above.

Furthermore, Applicants respectfully disagree with the Examiner's objections and submit that the disclosure as filed meets the requirements of Article 5 and Rule 5 of the PCT, and no corresponding objection has been risen during Preliminary International Examination, as can be seen from the International Preliminary Examination Report, an English language translation of which should have been officially received from the International Bureau. In case the latter is missing, Applicants will be pleased to provide a copy for the Examiner's convenience on request. To the contrary, the IPER expressly states novelty and inventive activity for the claims objected,

and in the corresponding reasons stated in the IPER the International Preliminary Examination Authority commented on the subject matter and its advantages, as already depicted above, and they did not indicate that they had any difficulty in understanding how to make and use the invention.

As to a socket connection, a bayonet connection, single-pitch screw and nut thread, multi-pitch screw and nut thread, a rectangular thread, a trapezoidal thread per se, it is respectfully submitted that details in design of the same as such is basic knowledge of an engineer or a skilled machinist.

Accordingly, Applicants respectfully request that the Examiner's objection be withdrawn.

CLAIM REJECTIONS – 35 USC § 102

In paragraph 3 of the Office Action, the Examiner object claims 19 to 22, 24, 27, 28, 34, and 35, as being anticipated by Emerson (United States Patent No. 5,722,881). The Examiner alleges that Emerson discloses in Figs. 1 to 10 and col. 2, line 66 to col. 5, line 3, a flap-type grinding tool 58 comprising an outer portion, a plurality of abrasive flaps 66 disposed on a periphery of the outer portion, a support body on which the abrasive flaps are fixed, a device for connecting the flap-type grinding tool 58 to a drive apparatus 21, wherein the support body has a rotationally symmetrical lateral surface on which the abrasive flaps 66 are fixed, a central element configured as a disk 60, a carrier ring 64 on radially outermost outside of the lateral surface is formed approximately parallel to the axis of rotation, the disk and carrier ring are produced of steel, the carrier ring and the disk are connected to one another by bonding, the

abrasive flaps are disposed both on the periphery and on the end face of the flap-type grinding tool, the disk is configured as a rapid clamping apparatus.

Applicants' Response

Applicants respectfully disagree, and assert that the subject matter defined in the claims is not anticipated by Emerson. Without intending to limit the invention to the following simplified description, the flap-type grinding tool of the invention is essentially a multi part product allowing separating of the parts after use of the grinding tool by allowing re-use or recycling of reasonable parts thereof, while minimizing the amount of waste coming with the use of a grinding tool according to the invention. It is easier in mass production to obtain highly accurate circular motion of the grinding tool, and consequently, higher working quality by use of a tool according to the invention, at less overall costs although its manufacture seem to be more complicated than the manufacture of prior art flap-type grinding tools.

Emerson discloses a flap-type grinding tool with a number of grinding flaps on its radially outer circumference. In the embodiments depicted in Figs. 4, 5, 6, and 7, particularly as can be easily seen in figs. 6 and 7, the grinding flaps are directly laminated onto the radial edge of a disk like support body. The disk like support body is described as consisting of a support plate 36 and a disc-like fiber plate 32. Each of the flaps 44 is described as being directly disposed on the support plate 32 (see col. 4, line 13) and affixed by an epoxy 45 (see col. 4, line 33).

For connecting to an usual angle grinder an integrally formed or welded hex nut 40 is provided which projects over a rotational body formed by the outer edges of the flaps, as can easily be seen from Fig. 7.

Emerson shows an alternative embodiment in Figs. 8, 9, and 10. A support member is formed from a metallic plate 60, comprising a central disc-like part having an integrally formed outer rim 64. Onto the latter a number of abrasive flaps are disposed and fixed with epoxy. That embodiment is intended for mounting on a protruding spindle end as often used with stationary grinding machinery.

The basic teaching of Emerson is to make a flap-type grinding tool as simple as possible and to reduce the number of elements which needs processing during manufacture to the minimum possible, in particular to directly fix the grinding flaps to the disc-like support element with an epoxy especially without a further element to avoid mounting or fixing of a separate support ring or the like, as taught by the current application, please see Figs. 5, 6, and 7, and corresponding description. Where the contact surface on the periphery of the disc-like element 60 is too small, it is proposed to form a rim 64 on the metallic disc-like element 60 to enlarge the bonding surface for the flaps 66, as shown in Figs. 8 to 10 and corresponding description. Nevertheless, also the embodiment of Figs. 8 to 10 avoids a separate carrier ring as quoted in claim 19 of the instant application.

The Examiner's attention is respectfully drawn to Figs. 8 and 9 and to col. 4, lines 50 to 56, indicating that the embodiment shown and described does not have any additional separate carrier ring, but an integrally formed rim or flange 64 formed on the metallic disc plate 60. Consequently, Emerson cannot show that "the carrier ring and the disk are connected by bonding", as flange 64 is integral part of the disc 60. Emerson does not discuss any variation in the material used for the disc element and a separate carrier ring, nor any way how to connect them, as already acknowledged by the Examiner.

With respect to the objection made to claim 27, we have no idea where corresponding features should be found in the Emerson document. Although Emerson shows abrasive flaps on one end side of a grinding tool in Fig. 2 with reference to prior art, and on the radially outer periphery with respect to the embodiments of Figs. 5 and 8, there is no disclosure for a combined arrangement having flaps on both the periphery and end side.

With respect to claims 28, 34, and 35, there is no disclosure from Emerson regarding a rapid clamping arrangement for interconnecting with a drive mechanism. To the contrary, Emerson does disclose only standard connections, like providing a hole 62 for conventional bolt and nut connection to a shaft end, and standard thread nut 40, 41.

Accordingly, Applicants respectfully request that the Examiner's objection be withdrawn.

CLAIM REJECTIONS – 35 USC § 103

In paragraph 4 of the Office Action, the Examiner objects to claim 23 as being unpatentable over Emerson (United States Patent No. 5,722,881). In particular, the Examiner alleges that Emerson makes it obvious for a skilled person to produce a support body and a carrier ring from different material.

Applicants' Response

Applicants respectfully disagree, and assert that the subject matter defined in the claims is not suggested by Emerson.

As it is the basic concept of Emerson to avoid a separate carrier ring which is separable from the support body, Emerson does not suggest to select different material for a

support body and a carrier ring. As the claimed subject matter is contrary to the teaching of Emerson, it is not suggested by Emerson.

Accordingly, Applicants respectfully request that the Examiner's objection be withdrawn.

CONCLUSION

Applicants believe the case is in condition for allowance, and review and reconsideration of the claims and allowance of claims 19 to 30 and 34 to 37 is respectfully requested. However, if any issues remain, the Examiner is invited to telephone the undersigned to resolve such matters before issuing another Office Action in the case.

ASSOCIATE POWER OF ATTORNEY

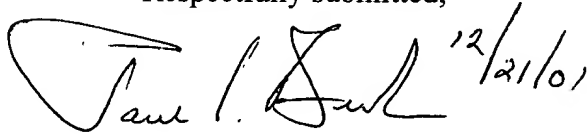
Enclosed with this amendment is an Associate Power of Attorney appointing Paul A. Beck & Associates as associate attorney(s) to prosecute the application identified above and to transact all business in the Patent and Trademark Office connected therewith. Please direct all future correspondence to Paul A. Beck & Associates, Suite 100, 1575 McFarland Road, Pittsburgh, PA 15216.

INFORMATION DISCLOSURE STATEMENT

Enclosed is an Information Disclosure Statement being filed after the period specified in 37 CFR 1.97(b) provided that the Information Disclosure Statement is filed before the mailing

date of a Final Action under 37 CFR 1.113, a Notice of Allowance under 37 CFR 1.311 or an Action that otherwise closes prosecution in the application, and accompanied by the fee set forth in 37 CFR 1.17(p).

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "Paul A. Beck", followed by the date "12/21/01".

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